

This listing of claims will replace all prior versions, and listings, of claims in the application:

Listing of Claims:

1. (currently amended) An apparatus for laser material ~~processing~~ machining comprising:
 - a work platform for holding a workpiece upon which a laser beam is applied;
 - a fluid conduit adapted to discharge fluid across the surface of the workpiece; and
 - a flow control means fluidly coupled to the fluid conduit, the flow control means adapted to regulate the discharge of fluid across the workpiece concurrent with the application of the laser beam, said flow control means creating a flowing layer of fluid across the surface of the workpiece in the region being exposed to the laser beam, with the thickness of the layer being in the range of 25 to 100 microns for facilitating the machining of the workpiece by the laser beam.
2. (original) The apparatus of claim 1 wherein the fluid discharged across the workpiece is substantially transmissive relative to light emitted from the laser beam.
3. (original) The apparatus of claim 2 wherein the fluid is water and laser beam emits light at wavelengths between 190 and 1100 nm.
4. (original) The apparatus of claim 1 further comprising:
 - a propellant conduit adapted to discharge propellant, the propellant conduit fluidly coupled to the fluid conduit; and
 - a nozzle fluidly coupled to the fluid conduit whereby the fluid is discharged across the workpiece by the propellant.
5. (original) The apparatus of claim 4 further comprising an atomizing means for discharging the fluid and propellant together as a spray.

6. (original) The apparatus of claim 4 wherein the propellant is substantially transmissive relative to light emitted from the laser beam.
7. (original) The apparatus of claim 6 wherein the propellant is nitrogen.
8. (original) The apparatus of claim 6 wherein the propellant is helium.
9. (original) The apparatus of claim 6 wherein the propellant is argon.
10. (original) The apparatus of claim 6 wherein the propellant is carbon dioxide.
11. (original) The apparatus of claim 1 further comprising a fluid vacuum adapted to withdraw fluid discharged across the workpiece.
12. (original) The apparatus of claim 1 further comprising a computer processor communicatively coupled to the flow control means.
13. (original) The apparatus of claim 4 further comprising a computer processor communicatively coupled to the nozzle.
14. (original) The apparatus of claim 11 further comprising a computer processor communicatively coupled to the fluid vacuum.
15. (original) The apparatus of claim 1 further comprising:
 - a computer processor communicatively coupled to the flow control means;
 - a computer readable medium communicatively coupled to the computer processor;
 - a fluid control module stored on the computer readable medium adapted to stop the discharge of fluid across the workpiece prior to completing a cut-through of the workpiece by the laser beam.

16. (original) The apparatus of claim 4 further comprising:
a computer processor communicatively coupled to the flow control means and the propellant conduit;
a computer readable medium communicatively coupled to the computer processor;
a fluid control module stored on the computer readable medium adapted to stop the discharge of fluid across the workpiece by closing off the fluid conduit means and removing residual fluid from the workpiece by opening the propellant conduit prior to completing a cut-through of the workpiece by the laser beam to push residual fluid off the workpiece.
17. (original) The apparatus of claim 1 further comprising:
a secondary reservoir holding at least one light-reactive chemical;
a secondary control valve disposed between the secondary reservoir and the fluid conduit whereby activation of the secondary control valve introduces the at least one light-reactive chemical into the fluid conduit.
18. (original) The apparatus of claim 1 further comprising a drainage conduit coincident to the workpiece and adapted to recover excess fluid initially discharged across the workpiece.
19. (original) The apparatus of claim 18 wherein the drainage conduit is fluidly coupled to the fluid conduit whereby excess fluid is recirculated.
20. (original) The apparatus of claim 19 further comprising a filter disposed in fluid communication between the drainage conduit and fluid conduit.

Claims 21-36. (cancelled)

37. (currently amended) A system for liquid-assisted, laser material processing, comprising:

an ultraviolet (UV) laser for emitting an UV laser beam;

a translation stage for mounting a workpiece for exposure to the UV laser beam;

an imaging system for imaging the beam to the workpiece;

a nozzle coupled to a liquid reservoir, which contains a liquid, for propelling a fine spray of the liquid onto the workpiece to create a thin layer of liquid flowing over the workpiece in a region exposed to the UV laser beam, said layer having a thickness between 25 and 100 microns;

the liquid being substantially non-photoabsorbing around a primary UV wavelength of the UV laser beam, and

wherein the translation stage is movable relative to the UV laser beam in at least two dimensions that are substantially in a plane of the workpiece, such that by translating the stage, a substantial surface area of the workpiece may be machined by exposure to the incident UV laser beam.

38. (previously presented) The system of claim 37, wherein the nozzle is directed at the workpiece.

39. (previously presented) The system of claim 37, wherein the fine spray becomes a mist as the liquid settles onto the workpiece.

40. (previously presented) The system of claim 37, wherein the liquid substantially comprises water.

41. (previously presented) The system of claim 37, wherein the imaging system comprises a focusing lens.

Claims 42- 43. (cancelled)

44. (previously presented) The system of claim ~~[[42]]~~ 37, wherein the thin layer is between 25 and 60 microns thick.

45. (previously presented) The system of claim ~~[[42]]~~ 37, wherein the thin layer is between 25 and 50 microns thick.

Claim 46. (cancelled)

47. (currently amended) The system of ~~claim 42, wherein the application region comprises claim 37 wherein the layer of liquid covers~~ a few square millimeters of surface area of the workpiece.

48. (currently amended) The system of claim ~~[[42]]~~ 37, wherein the thin layer flows at a flow rate of around one milliliter per minute.

49. (previously presented) The system of claim 37, wherein the nozzle is further coupled with a propellant for assisting in the propelling of the fine spray of the liquid.

50. (previously presented) The system of claim 49, wherein the propellant includes a pressurized gas that is not substantially photoabsorbing around a primary UV wavelength of the UV laser beam.

51. (previously presented) The system of claim 50, wherein the pressure of the pressurized gas is between 5 and 100 psi.

52. (previously presented) The system of claim 50, wherein the pressure of the pressurized gas is around 18 psi.

53. (previously presented) The system of claim 37, wherein the nozzle defines an orifice around 300 microns across.

54. (previously presented) The system of claim 37, further comprising a wet suction system for drawing the liquid from the workpiece.

55. (previously presented) The system of claim 37, further comprising a collection tray for collecting the liquid as it runs off of the workpiece.

Claims 56 to 88. (cancelled).

89. (new) The apparatus of claim 1, wherein the fluid layer is between 25 and 60 microns thick.

90. (new) The apparatus of claim 1, wherein the fluid layer is between 25 and 50 microns thick.